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Correction of time discretization schemes for diffusion equations with the nonsmooth data.
(Chinese. English summary) [Zbl 07404435]

Summary: When the initial value is not smooth, the accuracy of the numerical method for the time fractional homogeneous diffusion equation will decrease. In order to obtain the higher time convergence scheme, the weighted and shifted Grunwald-Letnikov’s correction scheme is introduced. We prove that the convergence order of the nonsmooth time fractional homogenous diffusion equation is still $O(k^2)$ by using the Lubich’s correction method. Finally, a numerical example is given to verify the agreement between the numerical results and the theoretical ones.

MSC:
65M99 Numerical methods for partial differential equations, initial value and time-dependent initial-boundary value problems

Keywords:
fractional derivatives; nonsmooth data; error estimates; Laplace transform